# Bioassay for mutagenic substances or radiation using cultured eukaryotic cells - with high frequency of spontaneous mutation

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## Abstract

Method (1) for detecting a mutagenic substance in a sample or for detecting mutagenic radiation comprises: (a) exposing cultured eukaryotic Hrea cells to the sample or radiation, (b) adding a ligand for Hsens, emitting a detectable signal, and (c) detecting the presence or absence of the signal after a time sufficient for any mutagenic effect to modify Hsens. Method (1) for detecting a mutagenic substance in a sample or for detecting mutagenic radiation comprises: (a) exposing cultured eukaryotic Hrea cells (disclosed as being highly reactive cells with a high frequency of spontaneous mutation that express a highly sensitive gene product Hsens whose detectability will be altered by at least 50% upon mutation of the gene encoding it) to the sample or radiation, (b) adding a ligand for Hsens, the ligand being coupled or able to be coupled directly or indirectly to a molecule emitting a detectable signal, and (c) detecting the presence or absence of the signal after a time sufficient for any mutagenic effect to modify Hsens. Independent claims are also included for the following: (A) a method (2) for detecting a mutagenic substance in a sample or for detecting mutagenic radiation, comprising: (a) culturing eukaryotic Hrea cells in the presence of compounds that interact directly or indirectly with Hsens and are labeled directly or indirectly with a molecule emitting a detectable signal, (b) exposing the cells to the sample or radiation, and (c) detecting the persistence or evanescence of compounds A or the formation of compounds B that reflect the presence or absence of a mutation in the gene encoding Hsens; (B) a method for evaluating the mutagenicity of a substance or radiation, comprising: (a) culturing eukaryotic Hrea cells in the presence of compounds A that are selected from very long chain fatty acids (VLCFA) and lipid metabolites playing the role of VLCFA and are labeled (in)directly with a molecule emitting a fluorescent, phosphorescent, chemiluminescent, colorimetric, turbidimetric or electronic signal, (b) exposing the cells to the test substance or radiation, and (c) detecting the persistence or evanescence of compounds A or the formation of compounds B resulting from metabolization of compound A as a reflection of the presence or absence of a mutation in the gene encoding Hsens; (C) a method for

evaluating the mutagenicity of a substance or radiation, comprising: (a) exposing cultured eukaryotic Hrea cells to the substance or radiation, (b) adding a ligand for Hsens, the ligand being coupled or able to be coupled directly or indirectly to a molecule emitting a detectable signal, and (c) detecting the presence or absence of the signal after a time sufficient for any mutagenic effect to modify Hsens. (D) a monoclonal antibody or antibody fragment specific for VLCFA. (E) kit to diagnose the presence of a mutagen in a sample comprises a monoclonal antibody or reactive antibody fragment specific for compounds A and/or B, labeled with a molecule emitting a chromogenic, turbidimetric or electronic signal.